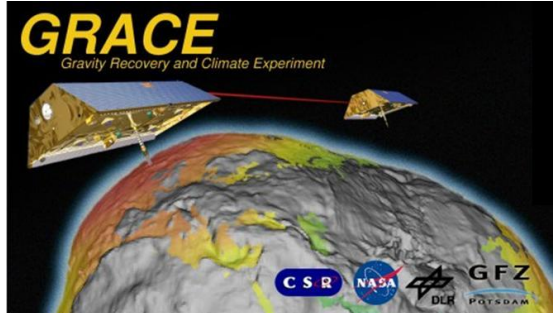


GRACE Science Data System Monthly Report

December 2010



Prepared by:
Frank Flechtner GFZ flechtne@gfz-potsdam.de

Contributions by:
Srinivas Bettadpur UTCSR srinivas@csr.utexas.edu
Mike Watkins JPL michael.m.watkins@jpl.nasa.gov
Gerhard Kruizinga JPL gerhard.kruizinga@jpl.nasa.gov

Approved by:
Byron Tapley UTCSR tapley@csr.utexas.edu

Highlights:

- CSR has generated and delivered RL04 Level-2 products for November 2010.
- GFZ has generated and delivered RL04 Level-2 products for October and November 2010.

Satellite Science Relevant Events:

- Operations in Science Mode throughout the month except for the periods highlighted in the L1B Data Processing section below.
- The GRACE-1 Brouwer mean orbital elements on January 1, 2011 00:00:00 are as follows:

89.013039

•

Level-0 raw data dump reception statistics at DLR ground stations Weilheim and Neustrelitz:

Level-1 Data Processing:

- Level-1B Release 01 instrument data have been processed at JPL and archived at GRACE-ISDC and JPL PO.DAAC. Please refer to the statistics below.
- Notes:
 - On 2010-12-02 10:20 a battery temperature test was conducted where GRACE-A was rolled by -20 degrees and GRACE-B by +20 degrees. Both spacecraft slewed back to a 0 degree roll on 2010-12-04 10:50. The KBR1B data in this interval passed all quality checks, but caution should be used when incorporating this data in the gravity field determination process
 - On 2010-12-19 at 13:40 heater table G was uploaded to GRACE-A in order to reduce the battery load. As a result, at 17:00 the X-SRF (Science Reference Frame) and Y-SRF ACC biases started to drift due to changing temperature of the ACC.
 - On 2010-12-24 00:00:00 the X-SRF and Y-SRF ACC biases stabilized, however, the Y-SRF ACC bias still shows small drifts over a day after 2010-12-24, due to lack of thermal control of the ACC using heater table G. The ACC1B after 2010-12-19 can not be used in the nominal gravity field determination process. Drifts in the ACC1B data need to be accommodated for use in the gravity field determination process. Given the large temperature reduction on the ACC, extra caution should be used, before incorporating this data in the gravity field.
 - For 2010-12-20 till 2010-12-27 see note 2010-12-19
 - On 2010-12-27 at 03:17 heater table G was uploaded to GRACE-B in order to reduce the battery load. As a result, at 05:00 the X-SRF and Y-SRF ACC biases started to drift due to changing temperature of the ACC. The GRACE-B ACC1B after 2010-12-27 can not be used in the nominal gravity field determination process. Drifts in the ACC1B data need to be accommodated for use in the gravity field determination process.
 - On 2010-12-28 the GRACE-B ACC was turned off at 02:46 to reduce the battery load. The GRACE-B ACC is expected to be turned back on in late January 2011. No nominal gravity field determination is possible until the GRACE-B ACC is turned back on.
 - For 2010-12-28 see notes 2010-12-19, 2010-12-27 and 2010-12-28
 - For 2010-12-29 till 2010-12-31 see notes 2010-12-19 and 2010-12-28
- **KBR statistics:**
 - A) KBR1B product name
 - B) Total arc length with data (hours)

C) Number of observations used in residual calculation

D) KBR-GPS range residual RMS (cm)

E) minimum KBR-GPS range residual (cm)

F) maximum KBR-GPS range residual (cm)

G) number of continuous segments in the KBR product

A	B	C	D	E	F	G
KBR1B_2010-12-01_X_01.dat	24.0	17280	0.33	-1.6	1.0	1
KBR1B_2010-12-02_X_01.dat	24.0	17280	0.49	-2.1	1.7	1
KBR1B_2010-12-03_X_01.dat	24.0	17280	0.34	-1.1	1.2	1
KBR1B_2010-12-04_X_01.dat	24.0	17258	0.45	-1.4	2.0	2
KBR1B_2010-12-05_X_01.dat	24.0	17280	0.38	-1.2	0.9	1
KBR1B_2010-12-06_X_01.dat	24.0	17280	0.53	-1.6	1.8	1
KBR1B_2010-12-07_X_01.dat	24.0	17280	0.38	-1.4	2.3	1
KBR1B_2010-12-08_X_01.dat	24.0	17280	0.49	-1.6	2.5	1
KBR1B_2010-12-09_X_01.dat	24.0	17280	0.46	-1.8	1.6	1
KBR1B_2010-12-10_X_01.dat	23.9	17203	0.35	-1.7	1.0	2
KBR1B_2010-12-11_X_01.dat	24.0	17280	0.31	-1.3	1.1	1
KBR1B_2010-12-12_X_01.dat	24.0	17280	0.38	-1.6	1.6	1
KBR1B_2010-12-13_X_01.dat	24.0	17280	0.66	-2.0	2.7	1
KBR1B_2010-12-14_X_01.dat	23.8	17145	0.36	-1.2	1.3	2
KBR1B_2010-12-15_X_01.dat	24.0	17280	0.48	-2.5	1.7	1
KBR1B_2010-12-16_X_01.dat	24.0	17280	0.32	-1.8	0.8	1
KBR1B_2010-12-17_X_01.dat	24.0	17280	0.52	-2.2	1.7	1
KBR1B_2010-12-18_X_01.dat	24.0	17259	0.27	-0.8	0.9	2
KBR1B_2010-12-19_X_01.dat	24.0	17280	0.30	-1.1	0.9	1
KBR1B_2010-12-20_X_01.dat	23.7	17061	0.41	-1.1	2.0	3
KBR1B_2010-12-21_X_01.dat	24.0	17280	0.42	-1.7	1.4	1
KBR1B_2010-12-22_X_01.dat	24.0	17280	0.32	-0.9	1.5	1
KBR1B_2010-12-23_X_01.dat	23.9	17239	0.29	-0.9	1.2	3
KBR1B_2010-12-24_X_01.dat	24.0	17280	0.34	-1.2	1.0	1
KBR1B_2010-12-25_X_01.dat	24.0	17280	0.26	-0.9	0.9	1
KBR1B_2010-12-26_X_01.dat	24.0	17280	0.24	-0.7	0.8	1
KBR1B_2010-12-27_X_01.dat	23.9	17224	0.31	-1.1	1.0	3
KBR1B_2010-12-28_X_01.dat	24.0	17260	0.58	-1.4	4.0	2
KBR1B_2010-12-29_X_01.dat	23.8	17145	0.34	-1.3	1.3	2
KBR1B_2010-12-30_X_01.dat	23.7	17061	0.29	-0.9	1.2	3

KBR1B	2010-12-31	X	01.dat	23.8	17145	0.26	-0.8	1.1	2
-------	------------	---	--------	------	-------	------	------	-----	---

- Following JPL RL00 (yellow) and RL01 (green) L1B products are publicly available. June and July 2002 (red) are not provided due to accelerometer problems.

[illegible]

- The L1B Read software has been updated to accommodate 64-bit machines but the software will also work on 32 bit machines. Please change RELEASE_2008-03-20 to RELEASE_2010-03-31 available at http://podaac.jpl.nasa.gov/grace/data_access.html.
- L1B De-aliasing Products Status (for details see AOD1B Product Description Document):
 - Release 01: Generation has been stopped June 30, 2007.
 - Release 03: Generation has been stopped January 31, 2007.
 - Release 04: Generated until January 7, 2011 and extended to 1976-2000 (see newsletter for December 2008). Quality statistics for Release 04 products are online available at <http://www-app2.gfz-potsdam.de/pb1/op/grace/results> (follow link GRACE Atmosphere and Ocean De-aliasing Statistics).
 - Following AOD1B products are publicly available (yellow: RL01, RL03 and RL04; green: RL01 and RL04, blue: RL04 only):

[illegible]

Level-2 Product Generation and Distribution:

- Besides historical CSR RL01, GFZ RL03 and JPL RL02 time-series (see below) and more experimental releases which are only available to the GRACE Science Team the following RL04 L2 products are presently available to the public (green: available, yellow: in preparation; red: missing due to accelerometer data problems):

- GFZ:** GSM solutions are available for August 2002 until November 2010. July 2004 until October 2004 and December 2006 are also available as constrained solutions (*GK2-*, reason is GRACE 4d repeat orbit and GPS anomaly on GRACE-B, respectively). October 2008 until September 2010 are also available as unconstrained solutions up to degree and order 60 (*GM60*, reason is GRACE 7d repeat orbit). Corresponding background GAA, GAB, GAC and GAD products and calibrated errors (GSM*.txt) have been provided too. Details are listed in the GFZ L2 Release Notes.

GFZ RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004							GK2	GK2	GK2	GK2		
2005												
2006												GK2
2007												
2008										M60	M60	M60
2009	M60	M60	M60	M60	M60	M60	M60	M60	M60	M60	M60	M60
2010	M60	M60	M60	M60	M60	M60	M60	M60	M60			

- CSR:** GSM solutions along with the GAC and GAD background model files and calibrated errors (GSM*.txt) are available for the period April 2002 until November 2010. Details are listed in the CSR L2 Release Notes.

CSR RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												

- JPL:** GSM along with the GAA, GAB, GAC and GAD background model files and calibrated errors (GSM*.txt) are available for the period April 2002 until October 2010. Details are listed in the JPL L2 Release Notes.

JPL RL04	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2002												
2003												
2004												
2005												
2006												
2007												
2008												
2009												
2010												

- GFZ has stopped RL03 processing (Feb 2003 until Jan 2007 available at the archives. For further details refer to the GFZ RL03 release notes for Level-2 products).
- CSR has stopped RL01 processing. (Apr. 2002 until Dec 2006 available at the archives. For further details refer to the CSR RL01 release notes for Level-2 products).
- JPL has stopped RL02 processing (January 2003 until November 2005 available at the archives. For further details refer to the JPL RL02 release notes for Level-2 products).
- TN05 containing C20 estimates derived from SLR and using GRACE RL04 standards is periodically updated.

Miscellaneous:

- The Proceedings of the Grace Science Team Meeting at GFZ in Potsdam on 11/12 November 2010 are online available at <http://www.gfz-potsdam.de/portal/gfz/Neuestes/Veranstaltungen/Tagungen+und+Konferenzen/2010-Conferences/GSTM-2010/proceedings>
- The following acknowledgement shall be added to any new GRACE related publication (paper, poster etc.): *Acknowledgement: We would like to thank the German Space Operations Center (GSOC) of the German Aerospace Center (DLR) for providing continuously and nearly 100% of the raw telemetry data of the twin GRACE satellites.*
- A list of GRACE related publications which can be sorted by author or date is available at <http://www-app2.gfz-potsdam.de/pb1/op/grace/> (current status: 713 papers). This list maybe still incomplete. If you are missing a publication please send an e-mail to Frank Flechtner (flechtne@gfz-potsdam.de).
- Science data users are encouraged to submit citations of their own and other works related with GRACE to the bibliography web page implemented at PO.DAAC: <http://podaac.jpl.nasa.gov/grace/bibliography.html>.